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Discussion Paper
No. DEDPS 25
July 2000

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Suntory and Toyota International Centres for
Economics and Related Disciplines
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Abstract

Recent theoretical and empirical work has demonstrated a clear negative link between macroeconomic and political uncertainty and levels of private investment across countries. This result raises the question what institutions might help reduce this uncertainty, in particular, by allowing host governments to limit their own possibilities to act opportunistically with respect to investors. Some have argued that governments might benefit from joining a multilateral investment agreement, but there remain doubts both about the enforceability and the desirability of such an accord. An alternative possibility, proposed in a seminal article by North and Weingast (1989), is that political institutions characterised by checks and balances can allow governments to credibly commit not to engage in *ex post* opportunism with respect to investors. In this paper I propose a modified version of this hypothesis and test it using new cross-country data on political institutions. I also use a quantile regression technique which allows the estimated effect of political institutions to vary across countries and over time.

Keywords: Political institutions, private investment, credible commitment, quantile regression.

JEL Nos.: C33, O38.

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1. Introduction

There has been increasing recognition in recent years that the irreversibility of many forms of private investment creates a credibility problem for governments. If a firm fears that a government will have an incentive to make *ex post* changes in taxes or regulations, it may prefer to delay or cancel a proposed project. Both sides would be better off if a government could somehow commit not to act opportunistically. This finding has major implications for developing countries, where investors may be particularly wary of the potential for radical and unexpected swings in economic policy. One proposal for reducing this uncertainty is for developing country governments to "tie their hands" by joining a multilateral investment agreement which would prohibit opportunistic changes in policy. Doubts remain, however, about both the enforceability of such an agreement and about the extent to which it would oblige countries to harmonize regulatory and tax policies.

An alternative institutional mechanism to reduce uncertainty was proposed in a seminal article by North and Weingast (1989); political institutions characterized by checks and balances can allow governments to credibly commit not to engage in *ex post* opportunism with respect to investors. In this paper I argue in favor of a modified version of their hypothesis. While one can predict that increasing the level of checks and balances in a country will increase policy stability, existing theory also shows how governments *without* checks and balances can establish credibility through other mechanisms. They can do this by

building a reputation, or more simply if investors are convinced that a government's objective function is such that there is little danger of opportunism.

The principal implication of this modified argument is that the effect of political institutions on private investment will vary across countries and over time. Governments in political systems with high checks and balances will, on average, find it easier to credibly commit, but we should also expect to see greater variability in levels of private investment within the set of observations where checks and balances are low.[1] This reflects the fact that some governments which lack checks and balances nonetheless find alternative routes to credibility. Ultimately, greater variability at low levels of checks and balances reflects the heterogeneity among authoritarian regimes which has been much emphasized in the literature on the politics of growth.[2] Panel data estimation methods which do not take account of this heterogeneity will provide misleading and potentially biased estimates (Robertson and Symons, 1992; Pesaran and Smith, 1995). Use of quantile regression techniques allows for addressing this issue by providing a more complete analysis of the conditional distribution than do other estimation techniques.

A further innovation of this paper is its use of new data designed to measure the extent of checks and balances in a country's political system (collected by Groff, Keefer, and Walsh, 1999 and Heinisz, 1997). In contrast with measures of democracy, such as the Gastil index, these two indicators are constructed

[1] The variance of the conditional distribution of private investment (conditional on checks and balances) should be higher at lower levels of checks and balances.
[2] See Clague, Keefer, Knack, and Olson (1996) and Alesina and Perotti's (1994) survey.

according to a pre-specified methodology and based on objective criteria. The other advantage of this new data is that it allows testing a more refined set of hypotheses. Rather than referring to the overall level of "democracy", the indicator I use is designed to measure something more specific: the extent to which a country's political institutions are characterized by multiple veto players in government. This new data also allows more exact testing of political hypotheses than does data provided by risk assessment services such as BERI, ICRG, or the Economist Intelligence Unit. These latter measures have been useful for establishing links between poor protection of property rights and poor economic performance, but because they measure policy outcomes, they give us little sense of what real world political institutions are associated with better protection of property rights.

My findings are consistent with the above propositions. A standard pooled regression suggests that the average long-run effect of moving from a parliamentary system with one veto player in government to one with three veto players would be a 14% increase in private investment. But quantile regression estimates show that this average coefficient estimate is misleading. At the 25^{th} percentile of the conditional distribution (of private investment conditional on checks and balances), the estimated effect of an identical increase in checks and balances is nearly twice as large (26%), while at higher percentiles of the conditional distribution the estimated effect of an increase in checks and balances on investment is close to zero. I will argue that the pattern identified supports the proposition that checks and

balances are a sufficient but not a necessary condition to achieve credibility.

The remainder of this paper is organized as follows. Section 2 reviews the theoretical link between political institutions, uncertainty, and private investment. Section 3 presents the data. Section 4 briefly investigates whether political checks and balances are correlated with cross-country survey data on perceived levels of policy stability. Sections 5 and 6 then conduct pooled regressions and quantile regressions to examine the relationship between political checks and balances and levels of private investment in developing countries. Section 7 discusses robustness issues, and section 8 concludes.

2. Political institutions and private investment

Investment and uncertainty

Before considering how political checks and balances might reduce uncertainty, with knock-on effects of private investment, it is first worth reviewing the economic literature on investment and uncertainty. This shows that predictions about the sign of the uncertainty-investment link depend heavily on what assumptions go into one's model. If one assumes perfect competition, costless adjustment of factors other than capital, and constant returns to scale, then uncertainty actually raises the expected profitability of capital and therefore should lead to higher investment. More recent work (by Dixit and Pindyck, 1993) shows that when one assumes that investments are irreversible, firms can be prompted to delay or forego investments out of the fear that the economic

environment might change for the worse. Irreversibility implies that downward adjustments in capital stock are more difficult to make than are upward adjustments.[3]

The cross-country empirical literature on determinants of private investment provides support for the claim that higher uncertainty is associated with lower levels of private investment. While most of these studies are limited by the fact that they use only cross-sectional data, Serven and Solimano (1993) and Serven (1998, 1997) have estimated investment equations using panel data, finding significant support for the claim that there is a negative investment-uncertainty link. Serven (1998) is the most complete of these studies, using a data set covering 94 developing countries over 26 years (1970-1995) and adopting sophisticated measures for macroeconomic uncertainty (variations in inflation, terms of trade, real exchange rates, and capital prices).

Political institutions, opportunism, and uncertainty

While existing work demonstrates that private investment is influenced by macroeconomic uncertainty, it would also be useful to consider how political conditions might affect perceived risks of opportunism for investors. As mentioned, irreversible investments may be subject to a credibility problem whereby a government has an incentive to change taxes or regulations *ex post* with the knowledge that investors cannot easily withdraw. For example, the well-known time-consistency problem in capital taxation exists even for governments which are social welfare

[3] As discussed by Serven (1998), in order to demonstrate a negative link between uncertainty and investment one needs to assume not only irreversibility but also either risk aversion, imperfect competition, or decreasing returns to scale.

maximizers. A proposed solution to this problem is for voters to strategically delegate to an elected representative who has a greater share of her assets in the form of capital than does the median voter in society (Persson and Tabellini 1994).

One point which further complicates the credibility problem in investment is that firms are unlikely to have complete information about the preferences of any individual government decision maker. Instead, investors will have to make decisions based on their prior beliefs about these preferences. Under these conditions, the presence of political institutions characterized by multiple veto points (multiple decision makers in government) can help minimize credibility problems, to the extent that the greater the number of veto points, the higher the probability that at least one veto point will be controlled by an actor who, because of the assets they or their supporters own, will oppose *ex post* opportunistic changes in policy. They key here is that control of a single veto point is, by definition, sufficient to block proposed changes in policy. More simply, if giving political control to a capitalist can solve the time-inconsistency problem in capital taxation, then all other things being equal, having multiple veto points in government increases the likelihood that at least one veto point will be controlled by a capitalist.

A veto point can be defined as a political institution, the holder of which has the power to block a proposed change in policy. Multiple veto points can be created by constitutional provisions which specify, for example, that multiple chambers of a legislature must approve any changes in laws. Multiple veto points can also exist as a consequence of electoral rules such as

proportional representation, which favor the development of coalition governments. In coalition governments any one member of the coalition may be able to veto a policy proposal by threatening to withdraw from the government if its demands are not satisfied.[4]

While the potential effect of multiple veto points on policy stability is clear, their overall effect on private investment is more ambiguous. In cases where investors find current policies to be favorable, but they fear potential future changes in policy, then institutions which promote policy stability are obviously of significant benefit. On the other hand, policy stability can also have a negative impact on private investment to the extent that it involves governments failing to make needed changes in policies in response to external shocks. This is particularly important in the area of macroeconomic policy, where a negative revenue shock, for example, will result in a deterioration of a country's fiscal balance unless adjustment measures are taken, and potentially in inflation to the extent that deficits are financed through money creation. Volatility of inflation creates uncertainty for investors about the profitability of potential projects. Fiscal deficits can have the well-known effect of crowding-out private investment. In empirical tests it is possible to control for this negative impact of checks and balances on private investment by including right-hand side variables for inflation volatility and the fiscal balance.

[4] For a survey of political and electoral institutions, veto points, and their effect on policy making see Tsebelis (1995).

Alternative sources of credibility

While having multiple veto points increases the likelihood of policy stability, governments in systems *without* multiple veto points can establish credibility for their economic policies through other means. To the extent that a government does not discount the future too heavily, it is well known that reputational equilibria may be established whereby a government has an incentive not to make opportunistic changes in policies, because doing so will result in a sanction from investors.[5] A second possibility for establishing credibility with only one veto point is more simple. The individual or political party which controls a single veto point might have an objective function which gives them little incentive to make opportunistic changes in policy (as in the case where decisions on capital taxation are delegated to a capitalist).

The above discussion leads to two observable implications with respect to checks and balances and private investment. First, checks and balances should, on average, be positively associated with levels of private investment. Second, we should expect to see greater variability of levels of private investment in countries with low levels of checks and balances. This would reflect the fact that for some of these countries, the absence of checks and balances will be a handicap to the extent it limits credibility. For others, the absence of checks and balances will be less of a handicap, because they will have established credibility through other means.

[5] The repeated games literature has of course, shown that this reputational equilibrium is but one of many possible outcomes.

Relationship of this argument to the broader debate on politics, investment, and growth

The issue of checks and balances and their impact on private investment is closely related to the broader debate on democratic institutions and economic performance. In terms of theory, if many political scientists have emphasized that democratic rights might help promote economic growth, others have emphasized how broadened political participation might lead to a deterioration in economic performance.[6] Empirical studies have generally failed to provide robust evidence in favor of either a positive or negative association of democracy with growth.[7] One possible reason for this is that democracy influences growth through numerous different channels, and these effects may have opposite signs. For example, democracy might help to reduce uncertainty and raise private investment, but it also might generate increased pressures for redistribution, thus lowering allocative efficiency.

Alesina and Perotti (1994) suggest another important reason for these inconclusive findings; dictatorships are a very heterogeneous group. Some authoritarian governments, like that of Singapore, have pursued policies that promoted fast growth. Others, like Mobutu's Zaïre, have tended towards kleptocracy. Still others, like Suharto's Indonesia, have at first been seen as models of stability, and subsequently, as prime examples of authoritarian misrule. The quantile regression techniques used in

[6] See for example Huntington (1968).
[7] See Barro (1996), Alesina and Perotti (1994), and Leblang (1997)

this paper allow one to take into account this implied heterogeneity among authoritarian governments.

In contrast to empirical studies on growth, there is a more statistically significant link between levels of private investment and overall levels of democracy. Serven (1997) finds that the Gastil index of civil liberties is significantly correlated with private investment in a panel data estimation which controls for other investment determinants. One reason for this result may be that focusing on private investment as dependent variable excludes some of the negative effects which democracy might have on economic performance via increased demands for redistribution.[8] As Serven himself notes, however, it is unclear exactly what phenomenon the Gastil indices are capturing.[9] This suggests a need for improved measures of political institutions. Second, even if civil liberties and private investment are significantly correlated in Serven's study, it remains possible that the effect of civil liberties varies substantially from country to country within his sample. Ideally, one would want to know if this parameter heterogeneity reflects heterogeneity among dictatorships.

In addition to the finding that measures of democracy are correlated with levels of private investment, several cross-sectional studies have identified a link between private investment and the

[8] Focusing on private investment rather than overall investment is also preferable when considering the effect of uncertainty, because Aizenman and Marion (1996) have shown that in cases where high uncertainty leads to a decline in private investment, public investment often increases in compensation.

[9] In terms of measurement, since the Gastil index is subjective, and no methodology is publicly provided for its assessment, the index may actually be measuring the overall institutional environment in a country, rather than just political or civil rights. There may also be an endogeneity bias if assessors are influenced by recent economic performance in deciding to what extent political and civil liberties have been present. The Polity III database's measure of democracy is also significantly correlated with levels of private investment. While, unlike the

measures of institutional uncertainty developed by risk assessment agencies. Brunetti and Weder (1998) and Poirson (1998) both find that indices of the rule of law, bureaucratic quality, and corruption are significantly correlated with levels of private investment, controlling for other determinants. These findings have made a significant contribution to the literature, but they have two shortcomings. First, indices such as the "rule of law" do not give any indication of which actual government institutions are associated with better provision of the rule of law. Second, like the Polity III and Gastil indices, measures of institutional quality may be subject to an endogeneity bias whereby their designers are influenced by overall economic performance in judging to what extent the rule of law, for example, is present. The political measures in this paper capture differences in actual political institutions while avoiding endogeneity bias by using objective formulae.

3. Data issues

The private investment dataset I use is an updated version of the developing country dataset from Serven (1998). It calculates annual levels of new private investment as the residual obtained after subtracting public sector investment from total investment. While the number of countries included is large, the dataset is unbalanced, with private investment figures for several countries only being available from the late 1980s.[10] The summary statistics

Gastil indices, the methodology for calculating the Polity III democracy index is made public, it remains subjective in its construction.

[10] Data on private investment, checks and balances, and other determinants of investment is available for 79 countries covering the period 1970-1994. A complete series of investment data is available for 48 of the 79 countries.

in Table I, below, present information on constant-price private investment as a ratio of GDP.

In order to control for determinants of private investment which are not related to political uncertainty, I follow existing studies by including several macroeconomic variables.[11] The annual growth rate of real GDP is included to capture the conventional accelerator effect of growth on investment. The standard deviation of the inflation rate is included, because variability of inflation creates uncertainty about the profitability of investment projects.[12] The level of private sector credit (as a share of GDP) should also be a determinant of private investment, and probably a more important one than the real interest rate, since many of the countries in the sample utilized direct instruments of monetary policy during the period considered. A dummy variable is also included for countries for which petroleum exports represent more than 50% of total exports, based on the logic that these countries may have higher levels of private investment due to higher foreign direct investment.

Other variables, such as the relative price of capital goods, and the overall fiscal balance (after grants) should also logically be included as economic determinants of investment, but due to data limitations, inclusion of these two variables would significantly reduce overall sample size (by 30% and 25% respectively).[13] This

[11] When not otherwise specified, the source for all data is the World Bank's *World Development Indicators.*

[12] This is measured as the standard deviation of a country's inflation rate over the previous seven years.

[13] The investment price ratio is measured as the ratio between the fixed investment deflator and the GDP deflator (as in Serven 1998).

would introduce a bias to the extent that the process for excluding observations was not a random one. As an alternative approach, I have chosen to use a procedure to impute missing values of these two variables. Results of investment regressions using these partially imputed variables are then presented . They are fully consistent with the results of regressions which did not include the imputed variables.[14]

The principal goal of this paper is to examine the link between political institutions and private investment, and to do so I make use of two newly developed measures of political checks and balances. Heinisz (1997) has developed a formula for measuring the institutional constraints placed on a country's executive based on (1) the number of formal constitutional veto points in a political system (executive, number of houses of the legislature, federal sub-units, and judiciary), (2) whether these veto points are controlled by different parties, and (3) the cohesiveness of the majority which controls each veto point. The justification for this last criterion is the claim that an executive facing a legislature controlled by a coalition of opposition parties will be less constrained than one who faces a legislature where a single opposition party is in control.[15] In contrast, if a legislative majority is politically aligned with the executive, then the executive will be more constrained in his/her actions when this majority is a coalition of several different parties as opposed to a single party. As a proxy for the cohesiveness of legislative majorities, Heinisz

[14] The procedure used was to generate imputed values by a routine in STATA which uses best-subset regression to estimate missing values based on the correlation between other regressors.

[15] Note, this method of measurement implies that the Heinisz index is an imperfect proxy for the number of veto players in a political system. The reason is that it is designed to measure constraints on the executive, while it ignores to what extent the legislature is also constrained.

adjusts his index according to levels of party fractionalization. The Heinisz data is available for the years 1971-1994. I have created a modified version of Heinisz's index (called *political constraints* here) which excludes data regarding federal sub-units (which may not have veto power over the policy decisions which matter to investors) and the judiciary.[16]

The second measure of checks and balances I use is the one developed by Groff, Keefer, and Walsh (1999) which is available for the years 1975-1994. Their key innovation is to provide direct evidence on the number of parties within legislative majorities, rather than inferring this from fractionalization data, as in Heinisz (1997). Their index is based on a formula which counts the number of veto players, based on whether the executive and legislative chamber(s) are controlled by different parties in presidential systems, and on the number of parties in government for parliamentary systems. The index is then modified to take account of the fact that certain electoral rules will affect the cohesiveness of governing coalitions. Greater internal party cohesion in closed list systems will be synonymous with a lower level of checks and balances. The index is also adjusted downwards for countries where there are significant restrictions on electoral competition.[17] A full description of the calculation of this index is presented in Annex II. Since the probability that at least one actor will prefer the status quo is likely to be a non-

[16] I have excluded the judiciary, because no accurate cross-country data is available to determine when and where the judiciary acts as a veto player with respect to policies which matter for investors. Heinisz (1997) uses data from risk assessment agencies to judge whether the judiciary is an independent veto player, but as noted above, risk assessment agency data has several significant shortcomings. For a full description of the formula used to calculate Heinisz's index see Heinisz (1997).

[17] When political competition is heavily restricted it seems less likely that veto players with heterogeneous preferences will hold office.

monotonic function of the number of veto players, a log version of the Groff, Keefer, Walsh index is used in this paper.[18]

A final group of regression variables is designed to capture the effect of political instability on investment. In contrast with cross-sectional analyses which average these variables over time, use of time-series cross-section data here allows for more precise testing of the extent to which change in a country's political system is associated with lower levels of private investment. Non-constitutional transfers of executive power (*coups*) are particularly likely to increase uncertainty.[19] One reason for this is that, as Londregan and Poole (1990) have shown, experiencing one coup tends to increase the probability that a country will suffer subsequent coups. When it is feared that an extra-constitutional transfer of power might take place, the number of formal veto points in a political system becomes increasingly irrelevant.

While *constitutional* transfers of political power are likely to generate less turmoil than will coups d'état, they still may be associated with increased uncertainty about the future course of government policies to the extent that election winners are not known beforehand and to the extent that the preferences of future election winners are not well known. I have included two separate variables to capture this effect, both of which are based on data collected by Heinisz (1997). Constitutional changes in the executive are measured by the zero-one dummy: *executive*. Constitutional change in the legislature are measured by the

[18] Otherwise this index would give as much weight to a change from 1 to 2 veto players are from 4 to 5, for example.

variable *legislative instability*, a continuous variable that measure the extent of legislature turnover in a given year.[20]

Table I: Summary Statistics

	# obs	Mean	Std. Dev.	Min.	Max.
Private investment% GDP	1611	11.6	6.7	0.14	44.9
Laggedinvestment %GDP	1611	11.6	6.7	0.14	44.0
GDP growth %	1611	0.01	0.06	-0.48	0.27
Private credit %GDP	1611	24.9	17.8	0.11	128.4
Inflation (stdev)	1605	0.70	4.54	0.001	53.4
Coups	1611	0.07	0.26	0	1
Legislative turnover	1611	0.04	0.16	0	2.24
Executive turnover	1611	0.11	0.31	0	1
Checks	1382	2.39	1.33	1	8
Checks (log)	1382	0.72	0.55	0	2.08
Political constraints	1611	0.15	0.18	0	0.66
Democracy (Polity III)	1611	3.2	3.7	0	10
Fiscal balance %GDP	1138	-0.04	0.06	-0.66	0.18
Investment price ratio	1220	0.97	0.25	0	2.59

4. A cross-sectional investigation of political institutions and uncertainty

The two main theoretical claims of this paper are that political checks and balances should be associated with higher levels of private investment, and that the lower the level of checks and balances, the greater the variability in levels of private

[19] This variable is based on data collected in Heinisz (1997).

[20] The formula for calculating this variable is $(\text{II} \mid S_2\text{-}S_1 \mid)/2$ where S_1 is a party's share of seats in the legislature in the previous year and S_2 is a party's share of seats in the legislature during the current year.

investment across countries. The reason for this link between checks and balances and private investment involves the potential for the former to reduce uncertainty. Before investigating the effects of checks and balances on private investment, it seems useful to consider the more direct question of whether political institutions actually do reduce policy uncertainty. If this can be demonstrated, it would support the claim that the effect of checks and balances on private investment occurs via uncertainty, and not for some other reason.

Data on perceived levels of policy uncertainty across countries have recently been collected in a firm-level survey financed by the World Bank. Among the questions posed, businesses were asked whether they feared that unanticipated changes in government policy would jeopardize the future profitability of their investments.[21] Brunetti and Weder (1998) have already found, based on indicators from this survey, that perceived policy uncertainty is negatively correlated with levels of private investment. A further question is whether these indicators of uncertainty are themselves endogenous to the structure of a country's formal political institutions.

Figure I, below, plots country averages for perceived policy uncertainty against levels of checks and balances, based on the *political constraints* measure developed by Heinisz (1997).[22] There is a clear positive relationship between the two variables. Results of a simple bivariate regression show that this relationship is

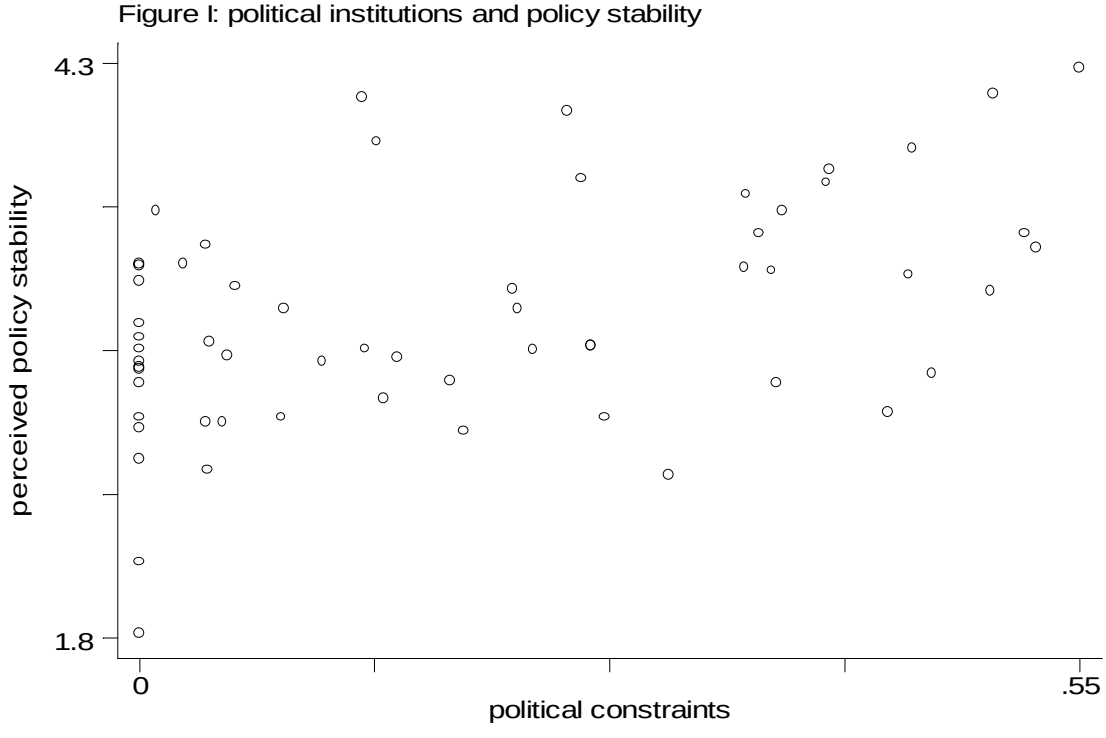
[21] The exact question was "Do you regularly have to cope with unexpected changes in rules, laws, or policies which materially affect your business?". See World Bank, *World Development Report 1997*.

[22] The country averages represent the average response by firms in a given country.

statistically significant.[23] Interestingly, the figure also seems to show that some countries have attained low levels of policy uncertainty despite having low levels of checks and balances. This supports the above proposition that checks and balances are not a necessary condition for credible commitment.

These cross-sectional results are consistent with the propositions laid out above. However, the robustness of this result is obviously limited by the fact that only cross-sectional data are available for perceived uncertainty. The above analysis also does not include any control variables. The next section addresses both of these issues in its consideration of the link between political institutions and private investment.

Figure 1



[23] The variable for policy stability is measured on a scale from 1 (low stability) to 7 (high stability). *Regression results:* Estimated perceived policy stability = 2.96 (0.08) + 1.27 (0.31) Political constraints. White's heteroskedastici consistent standard errors in parentheses. N=60.

5. Pooled investment regressions

Table II, below, presents results of several pooled investment regressions with *checks* and *political constraints* used as alternative measures of checks and balances. Regressions 1 and 2 were estimated using OLS without controlling for country-specific or year-specific effects. The coefficients on *checks* and *political constraints* are positive and significant at the 10% level and the 1% level respectively. It would be unwise to draw inferences from these estimates, though, because results of a standard likelihood ratio test show that groupwise heteroskedasticity is present.[24] While the use of White's standard errors can provide consistent standard error estimates, OLS may still be inefficient in the presence of groupwise heteroskedasticity.

Regressions 3 and 4 present GLS estimates which correct for groupwise heteroskedasticity by giving greater weight to countries where the variance of the residuals is lower. The procedure was iterated to obtain maximum likelihood estimates.[25] Both short and long-run coefficients of *checks* and *political constraints* in these regressions are significant at the 1% level. In terms of substantive significance, based on regression 3 a move from a purely authoritarian system (*checks*=1) to one with two veto players (*checks*=2) would be associated with a 2% short-run increase in investment and a 19% long-run increase in investment. Likewise, a shift from a parliamentary system with a single-party majority to one with a three-party coalition would result in a

[24] In both cases the null of homoscedasticity across groups was rejected at the p<.001 level. The test used was that presented in Greene (2000) p.511.

[25] Results of two-step estimates of this procedure were nearly identical to the ML estimates. The method used was that first proposed by Harvey and presented in detail in Greene 2000, pp.514-522.

short-run increase of 1% and a long-run increase of 14%.[26] Finally, results of regressions estimated using imputed values for the fiscal balance and an investment price ratio were fully consistent with the displayed results for regressions 3 and 4.[27]

Results for regressions 3 and 4 also show that coefficients on the economic determinants of investment such as GDP growth and private sector credit have the expected sign and the coefficients on GDP growth are highly significant. Results with regard to the political instability variables are less conclusive. While the coefficient for extra-constitutional changes in government (*coup*) has the expected negative sign, it is not statistically significant, and the coefficients for constitutional changes and parliamentary turnover are actually positive in both regressions.

Alternative specifications, unobserved country effects and heterogeneous parameters

While the above results suggest that high checks and balances are, on average, associated with high levels of private investment, they are subject to three potential shortcomings: (1) failure to control for other components of democracy (2) failure to control for additional unobserved country effects, and (3) heterogeneous regression parameters. This sub-section considers each issue in turn.

Checks and balances are not synonymous with democracy (witness countries like the UK which are democratic but have

[26] Substantive results from regression 4 are similar to those from regression 3. They are not directly comparable, however, because the political constraints variable is calculated based on the level of fractionalization within each legislative chamber rather than on the number of coalition partners.

political institutions with few veto points). But checks and balances in general are likely to be highly correlated with other characteristics of democracy, such as human rights, which may themselves have a positive effect on levels of private investment. It is difficult to control for these other characteristics, because panel data measures of other sub-components of democracy are not generally available.

Given this limitation, an alternative route is to include a more general measure of democracy, such as the Polity III democracy index (*democracy*), as a control in the Table II regressions (Gurr, Jaggers, and Moore 1998) When regressions 3 and 4 were re-estimated including this variable, the checks and balances measures remained significant while the indicator for democracy was not significant.[28] This result may be influenced by multicollinearity between the checks and balances measures and *democracy*, however, so I also conducted a non-nested test comparing the explanatory power of a model including checks and balances (but not *democracy*) and a model including *democracy* (but not checks).[29] This followed the J-test methodology for non-nested tests proposed by Davidson and MacKinnon (1981). These test results were consistent with the earlier regressions in favoring the checks and balances specification.[30]

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[27] Coefficients and standard errors for *checks* and *political constraints* were .030 (.009) and .077 (.023), respectively.

[28] Coefficients and standard errors for *checks* and *political constraints* were .024 (.010) and .072 (.025), respectively. Coefficients and standard errors for democracy were .0009 (.001) and .0003 (.001).

[29] The simple correlation between *democracy* and *political constraints* is 0.63. The simple correlation between *democracy* and *checks* is 0.49.

[30] These tests involved estimating the two alternative specifications and then re-estimating each specification while including the fitted values from the alternative model as a parameter. The *t*-statistic on the fitted values can be interpreted as a test of the null that the alternative specification *would not* add explanatory power to the existing model. In the case of the

In addition to failing to control for other components of democracy, the results from regressions 3 and 4 may also be biased by not controlling for country-specific effects and year-specific effects. Standard F-tests show that while a set of annual dummies when added to each of these was not jointly significant, a set of country dummies was jointly significant.[31]

While controlling for unobserved country effects by including a set of country dummies might distinguish the effect of *checks* and *political constraints* from other variables, this method also has the obvious disadvantage of sweeping away all cross-country variation in the data. This is particularly problematic given the pattern of variation of the checks and balances variables. While the institutional measure, *checks*, does vary over time, there are thirteen countries in the sample for which the variable remains constant. In each case these are purely authoritarian systems where *checks*=1. Likewise, there are 19 countries where the level of *political constraints* remains constant at 0. In estimating the coefficients for *checks* and for *political constraints* a fixed effects model would, in effect, ignore these countries. Even in those countries where levels of *checks* and *political constraints* have varied over time, changes have generally occurred with low frequency. A number of authors have recently suggested that precisely for these reasons, cross-country studies using fixed effects methods are inappropriate for establishing inferences from such data (Temple 1999; Pritchett, 1998). Results from regressions 5 and 6 in Table II should be viewed with this in mind.

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regression using *checks* and the regression using *political constraints* the null could not be rejected. In both alternative specifications using *democracy* the null was rejected.

[31] P-values for the test that all country dummies were equal were P<0.01 in both cases. For the annual dummies p-values were .15 for regression 3 and .26 for regression 4.

Table II: Panel Estimates of Private Investment Determinants

	(1) OLS	(2) OLS	(3) GLS	(4) GLS	(5) GLS-LSDV	(6) GLS-LSDV
Checks (short-run coeff)	**.033 (.018)**		**.027 (.009)**		**.013 (.012)**	
Checks (long run coeff)	**.292 (.151)**		**.271 (.087)**		**.054 (.052)**	
Pol. Constraints(short run)		**.089 (.035)**		**.076 (.023)**		**.023 (.029)**
Pol. Constraints (long run)		**.746 (.311)**		**.778 (.237)**		**.104 (.134)**
Lagged investment	.888 (.021)	.881 (.019	.901 (.010)	.902 (.009)	.759 (.018)	.775 (.014)
GDP growth %	.866 (.203)	.640 (.190)	1.12 (0.12)	.969 (.110)	1.12 (0.13)	.905 (.112
Private sector credit %GDP	.029 (.017)	.031 (.015)	.009 (.006)	.014 (.006)	.016 (.014)	.016 (.011)
Inflation (stdev)	-.002 (.003)	-.002 (.003)	-.0003 (.0017)	-.0006 (.001)	-.002 (.002)	-.002 (.002)
Coups	-.057 (.037)	-.064 (.034)	-.026 (.020)	-.021 (.016)	-.052 (.018)	-.040 (.016)
Legislative turnover	.059 (.031)	.040 (.026	.016 (.015)	.012 (.013)	.006 (.016)	.004 (.014
Executive turnover	-.019 (.025)	-.014 (.022	-.022 (.013)	.015 (.012	-.017 (.013)	.016 (.012)
Oil	.023 (.020)	.037 (.018	.006 (.012)	.021 (.012)		
N=	1376	1605	1374	1605	1374	1605
R^2	.82	.88				
Log likelihood			172.86	194.42	239.76	267.80

OLS estimates use White's heteroskedastic consistent standard errors.

Regressions 5 and 6 repeat the GLS estimation procedure while including a set of country dummy variables. The coefficients for *checks* and *political constraints* remain positive, but

neither the short-run nor the long-run coefficient are significant at conventional levels. They are both also considerably smaller in magnitude.

In addition to potential biases due to omitted variables, the results from regressions 3 and 4 in Table II may also be biased and misleading to the extent they ignore parameter heterogeneity. Results of a Wald test suggest that the null hypothesis that the parameters for political institutions (*checks* and *political constraints*) are constant across countries is massively rejected.[32] Incorrectly assuming parameter heterogeneity can have two major consequences. First, even if pooled regression gives a consistent estimate of the mean value for a parameter across countries, if parameter values do in fact differ greatly, then presenting an average is misleading. Second, in a dynamic panel data context, Robertson and Symons (1992) and Pesaran and Smith (1995) have shown that falsely assuming parameter homogeneity can bias estimates due to correlation of the error term with other right hand side variables. This generally leads to a downward bias on short-run coefficients and an upward bias on long-run coefficients.

Pesaran and Smith propose that when there is parameter heterogeneity across countries, consistent estimates of parameter averages can be estimated by taking mean values from individual country regressions. While this may generate consistent estimates,

[32] The procedure used was a Wald test of the null that the coefficients on *checks* and *political constraints* which resulted from individual country regressions were not significantly different from the average coefficient estimate provided by the GLS model which corrected for groupwise heteroscedasticity. In the case of the test for pooling across countries, the result for regression 3 was Chi(52)=105 P<.001. For regresson 4 the result was Chi(52)=110.5 p<.001. Tests of the constancy of parameters across years showed that the null could not be rejected. Results for regression 3 were Chi(20)=26.1 p=.16 and for regression 4 Chi(24)=18.41 p=.78. I tested for the constancy of the political institutions parameters alone (rather than the

drawing inferences under these conditions based on cross-country averages may still be misleading, and since there are relatively few observations per country in the panel used here (24 maximum), there is likely to be a massive loss of efficiency in performing country by country estimates. The following section proposes that quantile regression techniques can be used under these circumstances to establish different parameter estimates for different ranges of the conditional distribution. This method cannot fully take account of parameter heterogeneity, but it does allow one to test for one potential source of this heterogeneity, the fact that governments without checks and balances might find alternative means of establishing their credibility.

6. Quantile regression estimates

Section 2's theoretical discussion suggested that while high checks and balances should, on average, be associated with high levels of private investment, there should be greater variation in levels of private investment among countries with low levels of checks and balances. This pattern would reflect the fact that some of these governments might find alternative routes to credibility: by building a reputation or simply by having the "right" preferences. Visual examination of the bivariate relationship between investment and *checks* suggests that this may in fact be the case (Figure II, below), but this proposition can be tested more rigorously using quantile regression techniques.

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constancy of all parameters), because of the paper's emphasis on drawing inferences from these variables in particular. (Hsiao, 1986 pp.135-136).

Quantile regression as developed by Koenker and Bassett (1978) employs a least absolute deviation estimator which is often used to estimate a median regression line for the conditional distribution (rather than the mean line estimated by OLS). This estimation method can also be used to estimate percentiles of the conditional distribution other than the 50th. A test of the null hypothesis that slope parameters at different quantiles are equal can be used as a test for the presence of heteroskedasticity. Quantile regression can also be used to test specific propositions about the shape of the conditional distribution. Most applications of quantile regression have been in microeconomics.[33] In one example, Deaton (1996) has used quantile regression to show that while richer households in developing countries, on average, spend a smaller share of their income on food, it is also true that there is higher variance in the proportion of income spent on food among richer households. In other words, some rich households still spend significant shares of their income on food while others spend very little.[34]

The argument I have made about the effect of checks and balances can be tested in an analogous manner. If the variance of the conditional distribution of investment (conditional on checks and balances) is greater at low levels of checks and balances, then one should observe a pattern where, as the quantile one is estimating rises, the slope coefficients on *checks* and on *political*

[33] See Buchinsky (1994).

[34] Deaton demonstrates this by showing that when income share spent on food (YS) is regressed on overall income (Y), while the coefficient on overall income (Y) is negative in a regression at the 10th percentile, in a regression at the 90th percentile it is actually positive. The fact that the estimated coefficient on Y is more positive at higher quantiles shows that there is greater variation in the conditional distribution (YS conditional on Y) at higher levels of overall income.

constraints should become less positive. This can be tested by estimating the same specification as used in the regressions in section 4, but at several different quantiles (such as the 25th, 50th, and 75th). Different coefficients are observed for each quantile and tested against the null that they are equal to the coefficient from the 50th percentile.

Figure 2

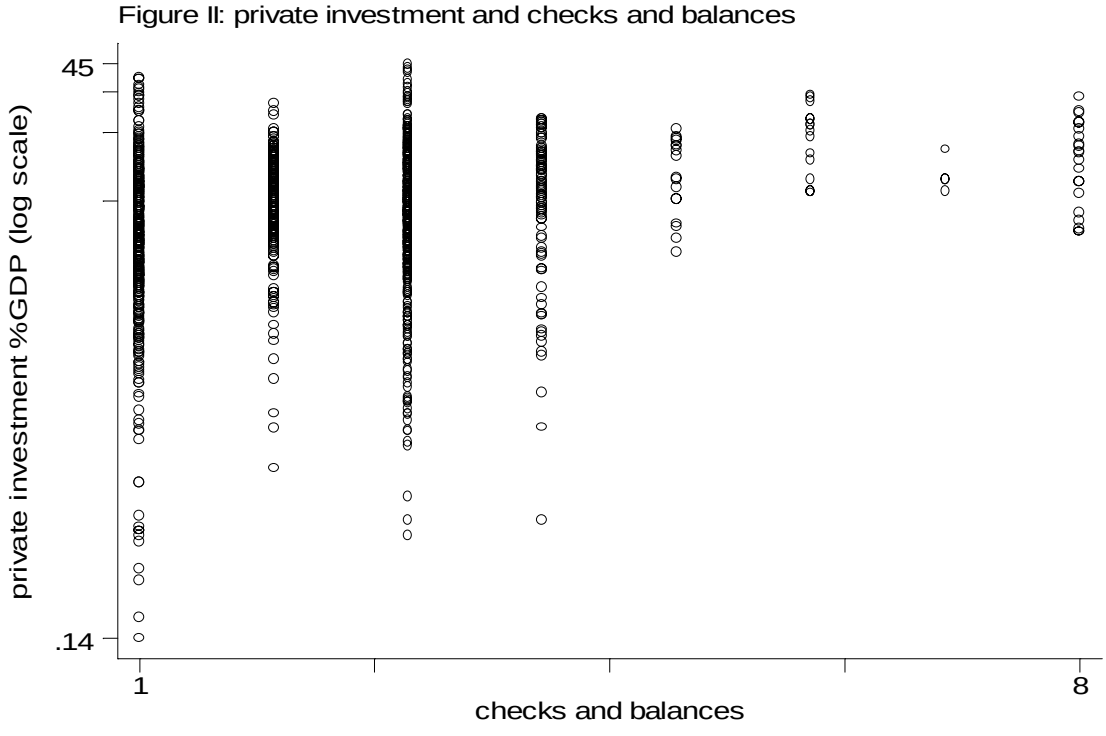

Table III, below, reports results for coefficients on *checks* and *political constraints* from quantile regression estimates (complete results for these regressions are found in annex 1).[35] As can be seen, both the short and long-run coefficients are more positive and more significant at lower quantiles. In substantive terms, in the regression using *checks* the estimated effect at the 25th percentile of a move from a one-party majority in a parliamentary system to

[35] Following other studies using quantile regression, I have used bootstrapped standard errors. This is necessitated by the fact that the density function for purposes of estimating the variance-covariance matrix is unknown. A common random number seed was used in all regressions in order to allow replication of the results.

a three party majority would be a 26% long run increase in investment. The estimated effect of a similar change at the 75th percentile would be only 6%. Quantile regressions using imputed values for the fiscal balances and an investment price ratio generated similar results.[36]

Results of Wald tests show that while one cannot reject the null that the 25th percentile coefficients are equal to the 50th percentile coefficients, one can reject the null that the 75th percentile coefficients are equal in three out of four cases (taking the 10% level as a cutoff).

Table IV repeats the exercise while including a set of dummies to control for unobserved country effects. Not surprisingly, given the correlation of the checks and balances measures with these country dummies, the magnitude of coefficients for *checks* and *political constraints* is considerably reduced, and they are no longer statistically significant at conventional levels. However, one still observes a pattern whereby the coefficients are less positive the higher the quantile estimated. What's more, in each of the four cases, Wald tests favor rejecting the hypothesis that the coefficients at the 75th percentile are equal to the coefficients at the 50th percentile. This is powerful evidence that the pattern in the conditional distribution observed in the Table III regressions is not attributable to a failure to control for country-specific effects.

[36] The coefficients and standard errors for *checks* at the 25th, 50th, and 75th percentiles were .039 (.016), .025 (.011), and .015 (.014). Coefficients and standard errors for *political constraints* at the 25th, 50th, and 75th percentiles were .132 (.029), .098 (.024), and -.003 (.041).

Table III: Quantile Regression Estimates of Investment Determinants (without country dummies)

	Checks		Political constraints	
Percentile	**Short run**	**Long run**	**Short run**	**Long run**
25th	**.028** (.016)	**.510** (.291)	**.126** (.043)	**1.83** (.778)
50th	**.020** (.011)	**.268** (.142)	**.080** (.026)	**1.05** (.385)
75th	**.014** (.015)	**.110** (.114)	**.019** (.041)	**.155** (.306)
25th=50th	P=.57	P=.19	P=.21	P=.24
75th=50th	P=.59	P=.08	P=.09	P=.08

Bootstrapped standard errors in parentheses. (100 replications) Checks regressions, N=1374. Political constraints regressions, N=1611.

While the above results show that there is, in fact, greater variance of the conditional distribution at lower levels of checks and balances, it is not possible to prove with existing data whether this is due to the fact that low checks and balances governments sometimes find alternative routes to credibility. What can be done is to investigate whether alternative explanations seem plausible. It is noteworthy in this regard that not all right-hand side variables in the quantile regressions have less positive slopes at higher quantiles (see Annex I). This reinforces the argument that the

reason for the observed pattern in the conditional distribution is specific to the checks and balances variables.

Table IV: Quantile Regression Estimates of Investment Determinants (with country dummies)

	Checks		**Political constraints**	
Percentile	**Short run**	**Long run**	**Short run**	**Long run**
25th	**.034** (.025)	**.136** (.096)	**.048** (.051)	**.255** (.269)
50th	**.027** (.023)	**.113** (.101)	**.044** (.045)	**.192** (.209)
75th	**-.006** (.022)	**-.021** (.076)	**-.021** (.041)	**-.077** (.142)
25th=50th	P=.77	P=.83	P=.94	P=.81
75th=50th	P=.05	P=.09	P=.07	P=.09

Bootstrapped standard errors in parentheses. (100 replications) Checks regressions, N=1374. Political constraints regressions, N=1611.

7. Robustness of the results

This final empirical section briefly examines whether the above results may be affected by the endogeneity of the political system to levels of investment.[37] Joint endogeneity of political

[37] Another potential robustness issue involves autocorrelation. While autocorrelation is a common problem in panel data, use of a specification that includes a lagged dependent variable generally provides a means of reducing any serial correlation of error terms. Results of Lagrange multiplier tests adapted for panel data show that the null hypothesis of no serial correlation cannot be rejected in any of the results of the pooled regressions in Table II. These

variables and economic performance has been a frequent concern in growth regressions. *A priori* there may be less reason to believe that the presence of checks and balances in a country's political system is endogenous to levels of private investment. The main reason for this would be that formal political institutions are modified only rarely. On the other hand, one might observe a phenomenon whereby increased growth and investment prompt rulers to relax restrictions on political competition. This change would, in some countries, lead to the emergence of multiple political parties in government. Since the indicators of checks and balances used in this paper take account of both the structure of formal political institutions and the extent to which these institutions are controlled by multiple actors, this would create an endogeneity problem.

I considered the potential endogeneity of the checks and balances variables in my sample by first running Granger causality tests. An initial variant involved regressing each checks and balances variable on lagged values of itself and on lagged private investment. Individual regressions were estimated for each country. In only three countries for *checks* and six countries for *political constraints* was the coefficient on lagged investment significant at conventional levels. A second variant of these tests involved regressing each checks and balances variable on its own lag and on a variable measuring the net change in the level of private investment over the previous four years. The coefficient on the change in investment variable was only significant in two countries in the case of *checks* and three countries in the case of

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tests were based on a variant of the Breusch-Godfrey test for serial correlation. In all cases p-

political constraints. While the number of observations in each of these individual country regressions was not large, this is nonetheless fairly convincing evidence that, on average, neither *checks* nor *political constraints* is Granger-caused by investment.

As a final test for the potential endogeneity of checks and balances, I considered whether there might be a simultaneity bias to the extent that checks and balances and private investment might be jointly influenced by certain political and economic shocks. One way to deal with this issue is to repeat regressions 3 and 4 from Table II while instrumenting for *checks* and *political constraints* with their respective lags. A Hausman specification test was then used to compare the OLS and IV estimates and so test for the consistency of the OLS estimates. In both the case of *political constraints* and *checks* the null of the consistency of the OLS estimates could not be rejected.[38]

In sum, while there is no doubting the fact that political and economic variables are often jointly endogenous, in the case of political checks and balances, it appears feasible to consider them as being exogenous to levels of private investment.

8. Conclusion

There are a number of mechanisms which might aid governments in committing not to make opportunistic changes in taxes and regulations once private firms have made irreversible investments. One which has received considerable attention would involve participating in a multilateral investment

values for the tests against the null of no serial correlation were P>0.99.

[38] P-values in each case were P>0.99.

agreement, but there are doubts about both the effectiveness and the desirability of this solution. This paper has investigated an alternative commitment mechanism - checks and balances in government. Results are consistent with the proposition that political institutions characterized by checks and balances allow governments to credibly commit, but that they are not a necessary condition for commitment to take place.

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Annex I: results of quantile regressions

```
˝
. sqreg lninv lninv_1 gdpdiff1 lncredit sdinfl oil coup
vuln exec_con lncheck2,
>  q(25 50 75) reps(100)

------------------------------------------------------
         |               Bootstrap
   lninv |      Coef.   Std. Err.       t     P>|t|
---------+--------------------------------------------
q25      |
 lninv_1 |    .945608   .0201261     46.984   0.000
gdpdiff1 |   1.236493   .1756387      7.040   0.000
lncredit |   .0544741   .0164766      3.306   0.001
  sdinfl |  -.0086865   .0044221     -1.964   0.050
     oil |  -.0193615   .0269047     -0.720   0.472
    coup |  -.0313721   .0416613     -0.753   0.452
    vuln |   .0360402   .0259217      1.390   0.165
exec_con |   .0068396   .0267691      0.256   0.798
lncheck2 |   .0280932   .0157065      1.789   0.074
   _cons |  -.1887225   .0558005     -3.382   0.001
---------+--------------------------------------------
q50      |
 lninv_1 |   .9241875   .0168346     54.898   0.000
gdpdiff1 |   .9275581   .2032632      4.563   0.000
˝
lncredit |   .0089257   .0094732      0.942   0.346
  sdinfl |  -.0005471   .0043939     -0.125   0.901
     oil |  -.0034596    .020806     -0.166   0.868
    coup |  -.0276101   .0221988     -1.244   0.214
    vuln |   .0236858   .0233953      1.012   0.312
exec_con |   .0147944   .0137765      1.074   0.283
lncheck2 |   .0204581   .0111328      1.838   0.066
   _cons |   .1317546    .039368      3.347   0.001
---------+--------------------------------------------
q75      |
 lninv_1 |   .8725054   .0222126     39.280   0.000
gdpdiff1 |   .7045227   .1752354      4.020   0.000
lncredit |   .0025671   .0145581      0.176   0.860
  sdinfl |   .0029052   .0038699      0.751   0.453
     oil |   .0182165   .0258873      0.704   0.482
    coup |  -.0498239   .0283413     -1.758   0.079
    vuln |   .0057412   .0293681      0.195   0.845
exec_con |  -.0037399   .0146028     -0.256   0.798
lncheck2 |   .0140458   .0154354      0.910   0.363
   _cons |   .4004142   .0562278      7.121   0.000
---------+--------------------------------------------
```

```
. sqreg lninv lninv_1 gdpdiff1 lncredit sdinfl oil coup
vuln exec_con npolcon,
> q(25 50 75) reps(100)
```

lninv	Coef.	Bootstrap Std. Err.	t	P>|t|
q25				
lninv_1	.9305864	.014584	63.809	0.000
gdpdiff1	1.033418	.1574906	6.562	0.000
lncredit	.0541627	.0158057	3.427	0.001
sdinfl	-.0095908	.0049402	-1.941	0.052
oil	.0044525	.0219323	0.203	0.839
coup	-.0465492	.036295	-1.283	0.200
vuln	.0284645	.0244182	1.166	0.244
exec_con	.0229971	.0270995	0.849	0.396
npolcon	.1263281	.0431084	2.930	0.003
_cons	-.1533325	.0523529	-2.929	0.003
q50				
lninv_1	.9244133	.014606	63.290	0.000
gdpdiff1	.6463827	.1939714	3.332	0.001
lncredit	.0086185	.009309	0.926	0.355
sdinfl	-.000896	.0050428	-0.178	0.859
oil	.0172731	.0184363	0.937	0.349
coup	-.017514	.0233542	-0.750	0.453
vuln	.0199302	.0190894	1.044	0.297
exec_con	.0141491	.0142314	0.994	0.320
npolcon	.0796622	.0257169	3.098	0.002
_cons	.1365434	.0315203	4.332	0.000
q75				
lninv_1	.8752501	.0191087	45.804	0.000
gdpdiff1	.5399975	.1754867	3.077	0.002
lncredit	.0025334	.0120354	0.210	0.833
sdinfl	.0024299	.0040784	0.596	0.551
oil	.0225518	.0218651	1.031	0.303
coup	-.0470735	.0268033	-1.756	0.079
vuln	-.0049083	.0273736	-0.179	0.858
exec_con	-.0038134	.0139273	-0.274	0.784
npolcon	.0194378	.0345812	0.562	0.574
_cons	.4010217	.0394757	10.159	0.000

Annex II: calculating the Groff, Keefer, Walsh index (checks)

For presidential systems, *check* is the sum of 1 for the president and 1 for each legislative chamber. The value is modified upwards by 1 if an electoral competition index developed by Ferree, Singh, and Bates is greater than 4 (out of a possible 7). Also, in closed list systems where the president's party is the 1st government party, then the relevant legislative chambers are not counted.

For parliamentary systems, *check* is the sum of 1 for the prime minister and 1 for each party in the governing coalition. If elections are based on a closed list system and the prime minister's party is the 1st government party, then this sum is reduced by one. As for presidential systems, the value of *check* is modified upwards by 1 if value of the Ferree, Singh, and Bates index for electoral competition is greater than 4.